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SINGLE-CHANNEL TELEVISION RECEIVER

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/Figures referred to are appended./

Television receivers using straight amplification are becoming more and more popular with radio amateurs. The rf amplification stages of these receivers are also used to amplify the accompanying sound signals. A block diagram of a receiver of this type is shown in Figure 1. The amplitude-modulated picture signal and the frequency-modulated sound signal are applied to the input of the rf amplifier. The frequency response of this amplifier is almost linear over the full range of frequencies (6.5 Mc), between the picture signal carrier frequency of 49.75 Mc and the sound carrier frequency of 56.25 Mc.

From the rf amplifier output, the signal is fed to the diode detector. The detector load separates not only the picture signal voltage but also the beat frequency, equal to the difference between the picture and sound carrier frequencies, or 6.5 Mc. Since the sound carrier is frequency modulated, the beat frequency is also frequency modulated.

Thus, drawing an analogy with a superheterodyne, the carrier frequency of the picture signal transmitter here is similar to the oscillator frequency, while the intermediate frequency of the sound channel corresponds to the beat frequency.

The signals are amplified further in the video amplifier. From the plate of the output stage, the signal is applied to the cathode-ray tube and the input of the i-f amplifier, which is tuned to the beat frequency.

The amplitude of the sound carrier frequency is suppressed strongly in the rf amplifier, and thus the sound does not cause picture interference.

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From the i-f amplifier, the signal is fed to the discriminator, converted to audio frequency, and amplified by the af amplifier.

The schematic diagram of the receiver in Figure 2 corresponds to the block diagram. The first three 6AC7s are the rf amplifier stages. Contrast is controlled by changing the grid bias of the second 6AC7. A blocking circuit (L_{10}, C_{33}) is provided to reduce the sound signal level. A 6H6 is used as the diode detector. A 6AG7 is used for the output stage, and provision is made for frequency correction (the chokes Dr_2 and Dr_3).

From the plate of the 6AG7, the signal is applied through the capacitor C_{13} (3$\mu\mu$fd) to the 6AC7 coil L_6, which is tuned to the beat frequency. This 6AC7 is the i-f amplifier and the discriminator is in its plate circuit.

The "partial" /ratio/ detector MS-1 (described in Radio, No 6, 1949) used in the receiver eliminates the need for a limiter. The second 6H6 is used as a discriminator and is tuned to an average frequency of 6.5 Mc. From the discriminator output, the signal is fed to the audio amplifier, in which a 6SJ7 and a 6F6 are employed. The volume and tone controls (resistors R_{21} and R_{27}) are in this amplifier.

The receiver is very simple in construction (all the coils and chokes can be made at home) and at the same time provides better television reception than a superheterodyne receiver with fewer tubes. If the receiver is to be used 20-30 kilometers from the television center, another rf amplifier stage should be added.

/Appended figures follow./

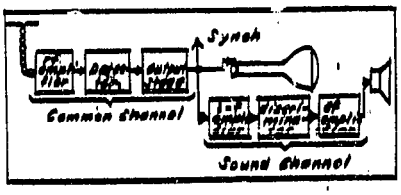

Figure 1. Block Diagram of the Receiver

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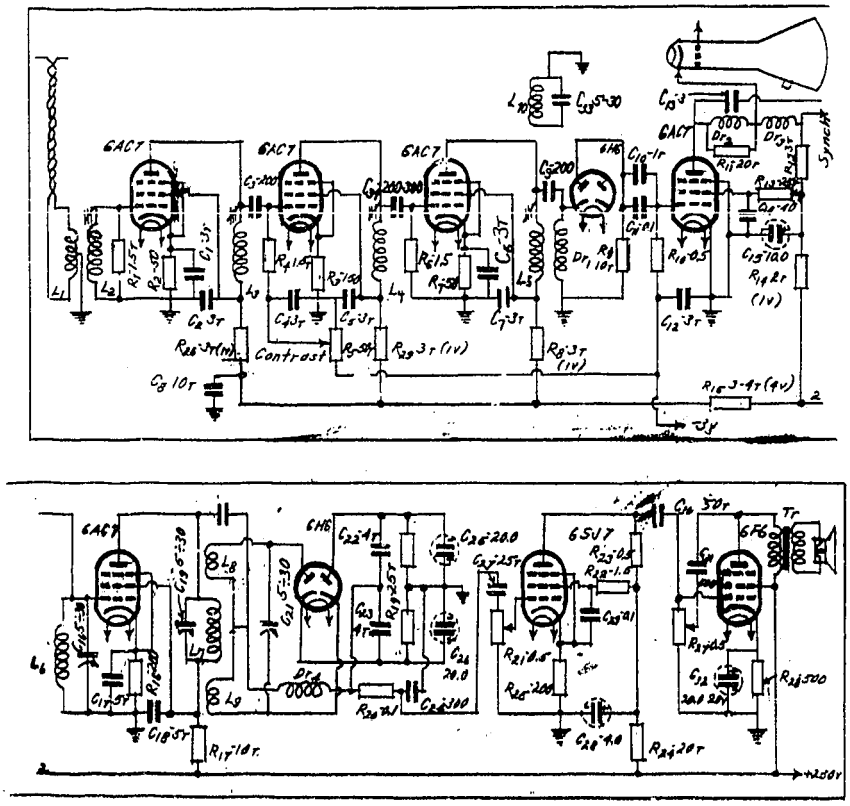

Figure 2. Schematic Diagram of the Receiver

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